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CERTIFICATION OF TRANSLATION

I, Eun-ah Choi, an employee of Y.P. LEE, MOCK & PARTNERS of The Cheonghwa Bldg., 1571-18 Seocho-dong, Seocho-gu, Seoul, Republic of Korea, hereby declare under penalty of perjury that I understand the Korean language and the English language; that I am fully capable of translating from Korean to English and vice versa; and that, to the best of my knowledge and belief, the statements in the English language in the attached translation of Korean Patent Application No. 1998-7525 consisting of 17 pages, have the same meanings as the statements in the Korean language in the original document, a copy of which I have examined.

Signed this 21th day of June 2004

Eun-ah Choi

ABSTRACT

[Abstract of the Disclosure]

5 A storage medium for storing catalog information and catalog information
playback apparatus and method are provided. By the method, catalog information
formed of a still picture and additional information together with audio data are recorded
on a storage medium such as a DVD, which is an optical record storage medium, and
the catalog information is played back during playback of audio, to thereby provide
various information on the audio. Also, the apparatus includes a buffer memory for
10 catalog playback maintaining the predetermined standard and compatibility, and
capable of real-time reading during playback of audio, and automatically playing back
the catalog content, corresponding to the playback state of the audio data, when there
is no additional selection of a user.

15 [Representative Drawing]

FIG. 3

SPECIFICATION

[Title of the Invention]

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Storage medium storing catalog information and apparatus and method for playing back catalog information

[Brief Description of the Drawings]

10

FIG. 1 shows a digital versatile disk (DVD)-read only memory (ROM) structure of one dimension according to an example of a storage medium storing catalog information of the present invention.

FIG. 2 is an example of a table showing catalog playback information for playing back catalog information according to the present invention.

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FIG. 3 is a block diagram of a playback apparatus for playing back catalog information according to the present invention.

[Detailed Description of the Invention]

[Object of the Invention]

20

[Technical Field of the Invention and Related Art prior to the Invention]

The present invention relates to a field of optical recording and/or playback, and more particularly, to a storage medium storing audio data and catalog information related to the audio data and an apparatus and method for playing back catalog information.

25

In an optical recording and/or playback apparatus in which a digital versatile disk (DVD) is used as a storage medium, a catalog function, and an apparatus or method for performing the catalog function has not been proposed.

30

Here, the catalog indicates prints for effectively transferring to a viewer information on manufacturing audio as a main data recorded on the storage medium, the record contents, and the composer, the artist and/or a performer, or material and

immaterial information for performing the same role. Particularly the catalog is an additional data for illustrating the contents of the audio which is main data recorded on the storage medium, consisting of additional information such as still pictures and caption as a video information.

5 The catalog data which is played back in a playback apparatus having a video decoder, preferably, has an inspecting function for reading the desired contents of the catalog, without interfering with the playback of the audio.

It is also preferable that the catalog information can be easily manufactured using the established editing system for DVD-Video.

10 In order to satisfy the above-described conditions, two types of information, i.e., audio and catalog data of which are different functions in a storage medium must be simultaneously played back. Thus, even when the audio data is played back at the maximum transmission speed of the playback apparatus, a predetermined amount of the catalog information must have already been played back and stored in a temporary
15 storage, so that both the audio and the catalog contents can be simultaneously played back.

That is, when the storage medium, in which information for forming the catalog is stored, is inserted into a driver, a player or an editor, the catalog information stored in the storage medium is read and stored in a temporary storage, i.e., a memory to be
20 output in the form of an image if necessary. Here, in order to store the catalog information read from the storage medium, in the memory, the image size must be defined, and further a method for effectively using the memory must be provided.

It is also preferable that navigation information, which has been proposed in the DVD-Video, i.e., search information added to the catalog information such that a user
25 can search an arbitrary catalog page, and a specification for processing the search information must be provided. Further, an editing system manufacturing a catalog corresponding to the specification shares with an editing system according to the DVD-Video specification.

Here, the DVD-Read Only Memory (ROM) means a record medium defined by

the physical specification of Part 1 of a DVD specification for read-only disc produced by Toshiba corporation and other companies in August, 1996 and the file system specification of Part 2 thereof. Also, the DVD-video means video edited by an image information recording method defined by the video specification of Part 3 thereof or a
5 DVD-ROM disk in which the video is recorded.

[Technical Goal of the Invention]

It is an objective of the present invention to provide a storage medium for storing catalog information to satisfy the above-described conditions.

10 It is another objective of the present invention to provide, playback apparatus and method for reading desired catalog contents from catalog information related to audio data, while the audio data stored in a DVD disk is played back.

It is still another objective of the present invention to provide an apparatus and method for automatically accessing the location of the catalog using real-time playback
15 information extracted from audio data to be played back without command to read the catalog in a predetermined location, while audio data stored in a DVD disk is played back.

Accordingly, to achieve the above objectives, there is provided a storage medium storing audio data and being capable of random accessing, wherein catalog information
20 related to the stored audio data is stored in a predetermined region.

Accordingly, to achieve the above objectives, there is also provided a playback apparatus comprising: storing means storing audio data played back from a disk and video data for catalog information related to the audio data; an audio decoder providing audio signals restored by decoding the audio data; and a video decoder restoring the
25 catalog information that include an image and additional information.

Accordingly, to achieve the above objectives, there is also provided a method of playing back audio data recorded on a disk, the method comprising the steps of: playing back catalog playback information connecting the audio data to catalog information related to the audio data; and playing back the catalog information recorded on a

predetermined region of the disk according to the catalog playback information during playback.

[Structure and Operation of the Invention]

5 The present invention will be explained with reference to the accompanying drawings.

Referring to FIG. 1, the storage space of the entire DVD medium is a volume space 100, which includes a volume and file system region 110 having information on the volume and recorded file structure, a video region 120 for recording image
10 information, an audio region 130 for recording audio data and an other file region 140.

The above data regions may have no information in the video region 120, and the catalog data related to each music may exist in a predetermined area of the audio region 130, and the other file region 140 may or may not exist.

Also, the video region 120 and the audio region 130 may consist of a video
15 management (VMG) region 121 and an audio management (AMG) region 131 having management information on the recorded image and audio, respectively and video title sets (VTS) 121 to 124 and audio title sets (ATS) 131 to 134, respectively, which are files in which the image and audio data are recorded.

The VTS have a plurality of video titles, and each video title consists of a plurality
20 of program chains (PGC) 125 to 128. The VTS file for the catalog may have information on still pictures formed of a plurality of catalogs and sub-pictures, and navigation information for controlling the information on the still pictures and the sub-pictures. Here, the navigation information indicates additional information for controlling image information, such as the number of sub-pictures to be searched, menu
25 information and search information. The structure of the information on the still picture and sub-picture, and the navigation, and the rules thereof are shown in the DVD-video specification.

According to the present invention, the catalog playback information for connecting VTS and ATS to each other to play back is stored in the AMG region 131 or

a predetermined region (information region) of the audio file. The AMG region 131 has a space for recording information on the entire audio region and each title, and a location of the catalog information may be additionally recorded on the AMG region 131.

In an embodiment of the present invention, the catalog playback information which is stored in the AMG region or the audio file region, may be stored in any location. Also, when the disk begins to be read, an appropriate means capable of distinguishing whether there exists the catalog playback information or not. The means may define the file names, a region of a disk predetermined by a physical or logical address may be designated as a space for storing catalog playback information, or information indicates whether existence of a file in which the catalog playback information is stored or not and a location of the file in the data region to be necessarily read such as a volume information region when the disk is read.

The catalog playback information may include the location of the image information in which the catalog is recorded, a file identifier (ID) and an auto presentation information table in which the location of the catalog to be played back corresponding to the predetermined time according to real-time playback information of the audio obtained by real-time playback the audio.

In FIG. 2, the file ID can recognize a file in which the catalog playback information is recorded. A catalog PGC number indicates the number corresponding to a common catalog and a title catalog in the video region in which the catalog is recorded. A catalog pointer indicates the location on the disk of a file or a PGC in which the catalog is recorded.

Also, the auto presentation information table has playback time information capable of appropriately and automatically playing back the catalog, using the real-time playback information obtained from the audio data while each recorded title is played back, and information on the playback location of the catalog, so that the auto presentation information table has information on the still picture and the sub-picture to

In FIG. 3, a signal read from a disk 210 is restored to a digital signal through a DVD playback processing unit 220 according to the physical specification of the DVD-ROM, to provide the restored signal to a buffer memory 250.

5 The restored digital signal is divided into audio data and video data under the control of a system controller 240 and the audio data of the DVD-Audio specification as an example is written in an audio buffer 251, and video data of the DVD-Video specification as an example, i.e., catalog data is written in a video buffer 252. At this time, the buffer memory 250 can use one memory space or an additional memory.

10 The catalog data stored in the buffer memory 250 is read in accordance with a control signal generated by the system controller 240 and the read catalog data is restored to an image signal to be output. At this time, the system controller 240 generates an appropriate control signal based on control commands of a user through a remote controller, the auto presentation information table according to catalog playback information, real-time playback information extracted from the audio data, and
15 navigation information of the catalog data, such that the catalog data stored on the video buffer 252 to be played back is output through the video decoder 270.

Meanwhile, the audio data of the DVD-Audio specification read from the audio buffer 251 is provided to the audio decoder 260 and the provided audio data is restored to an audio signal to be output.

20 Here, the video decoder 270 indicates a device restoring image data produced by the DVD-Video specification to an initial image and information added to the image. The apparatus for playing back the DVD-Video has already been produced and such apparatus is well-known to a person skilled in the art. Also, the audio decoder 260 restores the audio data consisting of the encoded audio data coded by linear pulse
25 coded modulation (linear PCM) or a predetermined manner, management information for managing the audio data and real-time playback information to initial audio and additional information. The system controller 240 and a servo unit 230 controls the system to appropriately operate using the control commands from a user and various control signals obtained by playback signals.

Subsequently, playback operation will be described by a video buffer 252 writing and reading catalog data shown in FIG. 3.

The playback apparatus of FIG. 3 must store information on the common catalog and the title catalog in the video buffer 252, before a predetermined audio title is played back. If not, desired catalog information cannot be played back while the music is played back.

When either the common catalog or the title catalog is selected, the sum of the two catalog data should be smaller than the memory capacity of the video buffer 252 for playing back the catalog. Referring to FIG. 1, assuming that the PGC1 125 is the common catalog for the entire audio region, and the PCG2 126 is the audio title 1, i.e., the title catalog 1 related to the first music, and the PCG3 127 is the title catalog 2 for the second music, and the PGCn+1 128 is the title catalog n for the Nth music, the catalog information required for playing back the music has the common catalog information and the title catalog for the music to be played back.

Meanwhile, the amount of buffer memory of the playback apparatus playing back the DVD-Video is approximately 4 MB (mega bit). This functions as a time buffer for resolving an inconsistency between a transmission speed of data read from the disk such as a variable buffer rate and a bit rate of audio played back in real-time or image information.

The conventional buffer must be used to play back audio in real-time, and an additional memory must be used to play back the catalog. Thus, assuming that a memory of 16 MB is the entire buffer memory 250 when one memory is used, the memory size of the video buffer 252 for playing back the catalog is 12MB. For instance, when the amount of the data of the common catalog is 5MB, the amount of the title catalog cannot exceed 7 MB.

Also, the title catalog information for each title may not exist. When the sum of the entire catalog data is smaller than the predetermined memory capacity of the video buffer 252, the catalog is not classified to the common catalog and the title catalog, and the catalog information on all music can be recorded in the common catalog.

When the disk is played back initially, the system controller 240 reads volume information of the disk, the file system, and information on VMG and AMG. As described above, the PGC data in which the catalog information exists is read from the video buffer 252 according to the catalog playback information stored in the AMG region 131 or in a predetermined file. When required catalog data is read, the audio information is read to provide the read audio information to the audio decoder 260 through the audio buffer 251, and the audio information is converted into an audio signal and the converted audio signal is output through the audio decoder 260.

Meanwhile, if a user selects the catalog, i.e., if the user inputs commands for a desired catalog through an input unit such as a remote controller for controlling the playback apparatus, the catalog information predetermined catalog data stored in the video buffer 252 corresponding to the input commands is provided to the decoder 270.

If the user does not input commands for playing back the predetermined catalog, i.e., the user does not operate for a predetermined time, or the user sets an auto presentation mode, the contents stored in the video buffer 252 is output through the video decoder 270 to output an image of the predetermined catalog using the information in the auto presentation information table.

At this time, the catalog information consists of still pictures for the backgrounds and sub-pictures for transferring characters and the still pictures and the sub-pictures are controlled using the navigation information defined by the DVD-Video specification. Thus, compared to the case of using only still pictures, 32 sub-pictures can be selected from the DVD-Video, which supports multiple languages.

Also, if the still picture includes character information, the increase in the resolution of the still picture is required for playing back the character information to distinct pictures, so that the compression ratio cannot be increased, and the background image and the character information are divided, so that the compression ratio for the background is increased, and characters can effectively be coded using a compression

[Effect of the Invention]

As described above, the catalog function is realized using the DVD-Video specification, to thereby edit the catalog for DVD-Audio using an editing system for the DVD-Video, and the playback apparatus for playing back the catalog of the DVD-Audio plays back also the DVD-Video, to thereby minimize additional circuits.

Also, according to the present invention, the predetermined DVD-Video specification is used, so that the character information of the catalog is not processed as the still picture but as the sub-picture, to thereby enable multiple language.

What is claimed is:

1. A storage medium storing audio data and being capable of random accessing, wherein catalog information related to the stored audio data is stored in a predetermined region.

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2. The storage medium of claim 1, wherein the catalog information includes common catalog data for information commonly applied for the entire audio data recorded on the storage medium and title catalog data having information corresponding to each music, and the predetermined region is an image information record region and the storage medium is a digital versatile disk (DVD).

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3. The storage medium of claim 2, wherein the catalog information is image information produced by the DVD-Video specification, and wherein the storage medium includes a region for recording the audio data and an image information record region for recording the catalog information.

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4. The storage medium of claim 3, wherein the catalog data is composed of program chains, and the catalog data includes a still picture for a background image, a sub-picture for a caption and navigation information for controlling the same.

20

5. The storage medium of claim 1, wherein catalog playback information connecting the audio data to the catalog information during playback is further stored in the audio information record region.

25

6. The storage medium of claim 1, wherein the catalog playback information includes a location of image information storing a catalog, a file identifier, and an auto playback information table determining a location of the catalog to be played back

in accordance with real time playback

7. A playback apparatus comprising:
storing means storing audio data played back from a disk and video data for
catalog information related to the audio data;

5 an audio decoder providing audio signals restored by decoding the audio data;
and

a video decoder restoring the catalog information that include an image and
additional information.

10 8. The playback apparatus of claim 7, wherein the catalog information
includes common catalog data for information commonly applied for the entire audio
data recorded on the disk and title catalog data having information on each music, and
the catalog data selected by a user is read from the storing means.

15 9. The playback apparatus of claim 8, wherein the catalog data is read from
the storing means by a predetermined sequence.

10 10. The playback apparatus of claim 8, wherein the catalog data stored in the
storing means is defined within a predetermined size.

20 11. The playback apparatus of claim 8, wherein the data size obtained by
adding data of the common catalog stored in the storing means to data of one selected
from the plurality of title catalogs is smaller than the capacity of the storing means.

25 12. The playback apparatus of claim 7, wherein the restored image is a still
picture for a background, and the additional information is a sub-picture for transferring
characters.

13. A method of playing back audio data recorded on a disk, the method

comprising the steps of:

(a) playing back catalog playback information connecting the audio data to catalog information related to the audio data; and

5 (b) playing back the catalog information recorded on a predetermined region of the disk according to the catalog playback information during playback.

14. The method of claim 13, wherein the predetermined region is an image information record region, and the catalog information recorded on the image information record region includes common catalog data for information in common
10 applied for the entire audio data recorded on the disk and title catalog data having information corresponding to each music.

15 15. The method of claim 14, wherein the catalog data selected by a user is played back in step (b).

16. The method of claim 14, wherein the catalog data is played back according to a predetermined sequence in step (b).

20 17. The method of claim 14, wherein the catalog data selected by a user is preferentially played back in step (b), and then the catalog data satisfies predetermined conditions to be played back.

25 18. The method of claim 17, wherein the predetermined condition is the case of selecting no predetermined catalog data for a predetermined time or setting a catalog auto presentation mode.

19. The method of claim 19, wherein the catalog playback information includes a location of image information storing a catalog, a filter identifier (ID), and an auto playback information table determining a location of the catalog to be played back

corresponding to a predetermined time in accordance with real-time playback information of audio obtained from the audio data during real-time playback.

20. The method of claim 19, wherein the catalog data is played back
5 according to information stored in the auto playback information table in step (b).

FIG. 1

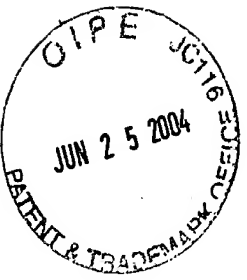
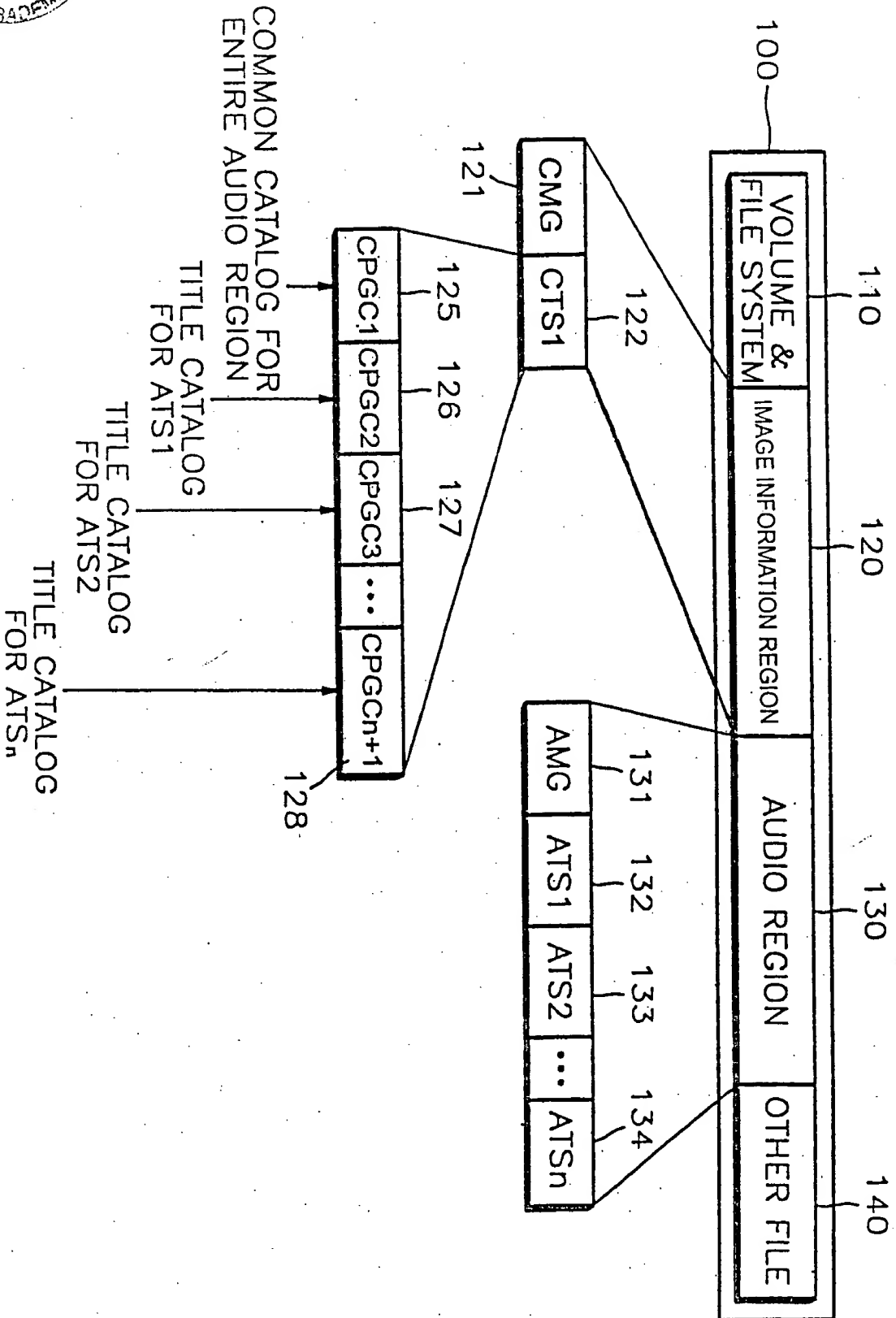


FIG. 2

FILE ID		
CPGC # FOR ALL AUDIO TITLES	FILE POINTER FOR CATALOG	AUTO PRESENTATION INFORMATION TABLE1
CPGC # FOR AUDIO TITLE1	FILE POINTER FOR CATALOG	AUTO PRESENTATION INFORMATION TABLE2
CPGC # FOR AUDIO TITLE2	FILE POINTER FOR CATALOG	AUTO PRESENTATION INFORMATION TABLE3
...
CPGC # FOR AUDIO TITLEn	FILE POINTER FOR CATALOG	AUTO PRESENTATION INFORMATION TABLEn+1

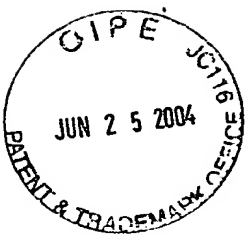


FIG. 3

